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ABSTRACT

The present practices and future possibilities of utilizing modern media in adult education are studied from the standpoint of (1) the major functions of modern media from the point of view of educational technology, and (2) the challenges of newly developed adult education to the conventional system of education. Chapter I, Basic Principles for Designing a New System of Adult Education, discusses fundamental issues involved in the use of technological devices. These issues concern the expected functions of modern media in adult education and the relationship between the system and its environment. In Chapter II, Teaching-Learning Process and Technological Innovations, the teaching/learning process, technological innovations and expansion of instructor's functions, the role of broadcasting, role of telecommunication, development of information package, and multimedia are presented. Chapter III, Use of New Instructional Communication Technology in Adult Education, provides discussions of classification of new instructional communication technology, use of broadcasting, new technology for information transmission--facsimile and telewriter, information retrieval by means of telecommunication technology, expansion of three-way communication by means of new telecommunication technology, and characteristics of new instructional communication technology. It is concluded that broadcasting and telecommunications technology is a suitable and indispensable media of adult education. (DB)

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THE USE OF MODERN MEDIA IN ADULT EDUCATION

JAPANESE NATIONAL COMMISSION FOR UNESCO

1972

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THE USE OF MODERN MEDIA
IN
ADULT EDUCATION

FOREWORD

Life-long education is to meet the diversified educational aspirations and needs of the society and individuals. It is widely recognized that the educational methods and techniques employed in the traditional education are no longer adequate to carry out life-long education for a wide variety and a large body of the target populations. Fortunately, the recent progress of science and technology offers an immense possibility of using technology for educational purposes. In particular, modern media have enormous potentialities. Studies and experiments are being made for the purpose of applying technology to education. In the field of adult education, however, comparatively little seems to have been done for the educational use of technology.

At the request of Unesco, the Japanese National Commission for Unesco undertook a study on the use of new modern media in the field of adult education for the purpose of making the result of the study available to the participants in the Third World Conference on Adult Education to be convened by Unesco in July-August 1972, at which discussion will take place on the utilization of major communication media.

The National Commission organized in October 1971 a study group consisting of the following members:

Mr. Isao Amagi	Former Vice-Minister of Education
Prof. Hiroshi Azuma	Professor of Tokyo University
Mr. Akira Beppu	Head, Lower Secondary Education Division, Elementary and Secondary Education Bureau, Ministry of Education
Mr. Kayao Kobayashi	Head, Guidance Division, Vocational Training Bureau, Ministry of Labour
Mr. Kikuo Nishida	Secretary-General, Japanese National Commission for Unesco
Prof. Takashi Sakamoto	Associate Professor, Tokyo Institute of Technology
Mr. Teruo Takeda	Managing director,

Mr. Nobuo Terawaki Nippon Telegraph & Telephone Public Corporation (NTT)
Deputy Secretary-General,
Research and Development Committee,
Japan Broadcasting Corporation (NHK)
Mr. Masahiro Yamanaka Head, Audio-Visual Education Division,
Social Education Bureau,
Ministry of Education

Headed by Mr. Amagi, the group met eight times. After the lively exchange of views and discussion among the members, the group entrusted the drafting of the report to Mr. Nishida for Introduction, Professor Azuma for Chapter I and Professor Sakamoto for Chapter II and III. The draft report was discussed by the group and modified in such a way as to reflect the opinion of the group as a whole.

Although the present report does not necessarily reflect any official views but the opinion of a group of Japanese experts, it is a sincere hope of the Japanese National Commission for Unesco that the readers will find it somehow interesting and useful for considering this important question for the future.

June 1972

Kikuo Nishida
Secretary-General
Japanese National Commission
for Unesco

CONTENTS

	Page
INTRODUCTION	
 CHAPTER I Basic Principles for Designing a New System of Adult Education	
1-1 The Problem	1
1-2 Expected Functions	2
1-3 The System and the Environment	4
 CHAPTER II Teaching-Learning Process and Technological Innovation	
2-1 Teaching-Learning Process	6
2-2 Technological Innovations and Expansion of Instructor's Functions	7
2-3 Role of Broadcasting	9
2-4 Role of Telecommunication Technology	10
2-5 Development of Information Packages	10
2-6 Multi-media System	11
 CHAPTER III Use of New Technology in Adult Education	
3-1 Classification of New Instructional Communication Technology	13
3-2 Use of Broadcasting	13
3-3 New Technology for Information Transmission – Facsimile and Telewriter	21
3-4 Information Retrieval by Means of Electronic Communication Technology	22
3-5 Expansion of 3-Way Communication by Means of New Telecommunication Technology	25
3-6 Characteristics of New Instructional Communication Technology ..	28
3-7 Conclusion	30

INTRODUCTION

The purpose of this study is to present a broad view of the present practices and future possibilities in the field of utilizing modern media in adult education. It includes various examples which seem to be promising for solving the difficult problems in the development of a new system of adult education, although some technical and financial problems will remain unsolved.

This study is based on two basic assumptions. One is concerned with the major functions of modern media from the point of view of educational technology. These may be classified as follows:

- a) Elimination of the barrier of distance in communicating information (mail, telephone, cables, radio, television, etc.),
- b) Packaging of useful information for repeated usage (books, slides, films, records, taperecorders, video-cassettes, etc.),
- c) Formulation of the teaching-learning process and programmed control (Programmed instruction, computer assisted instruction, etc.),
- d) Accumulation, retrieval, referring and processing of data (data-banks), and
- e) Model building for training in behavioral skills (simulators).

The second assumption is concerned with the challenges of newly developed adult education to the conventional system of education. These may be listed as follows:

- a) Enormous population scattered in a wide area,
- b) Diversity of time and places available for learning according to various working and living conditions,
- c) Shortage of qualified teachers to meet the widely diversified educational needs,
- d) Limitation of the available communication media by illiteracy and diversity of native languages.

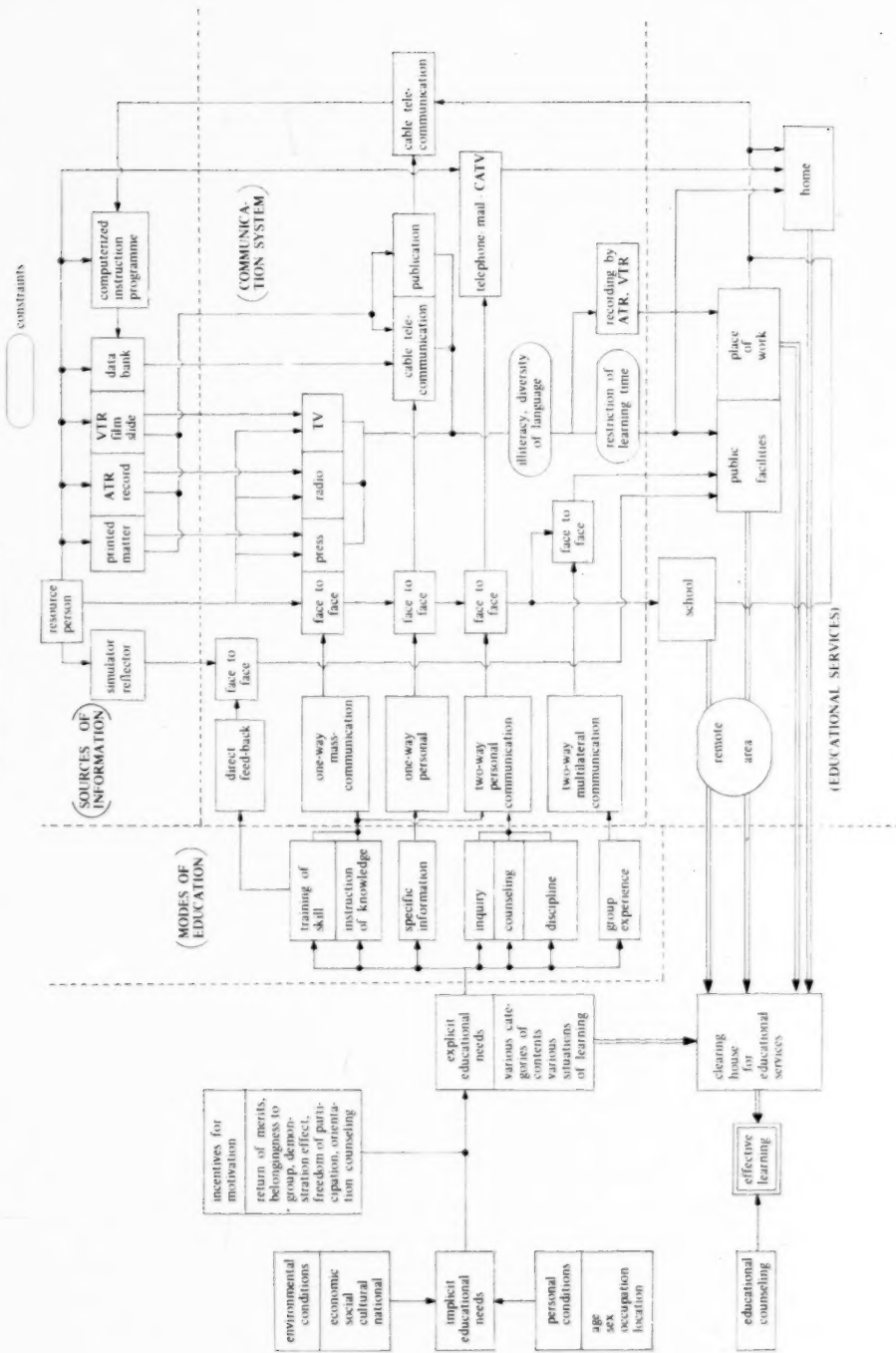
The main problems of this study will be defined according to the extent to which the above-mentioned functions of modern media mainly a) and b), can be utilized to cope with the challenges of adult education in the near future. The presentations and suggestions in this paper may be useful within such a framework of consideration. However, it must be realized that the effective design of modern

adult education will necessarily include much more difficult problems in other respects. For example, no system of education can be effective unless it is designed on the basis of the existing society. The design of an educational system should take into account the results of a careful consideration of how to motivate each individual to utilize educational services provided and of the kind of educational approaches which will be most suitable to attain a certain educational goal, e.g., instruction, training, counselling, group experience, or discipline. These fundamental issues underlying the use of technological devices will be discussed in Chapter I.

In Chapter II and III, the role of new modern media in the teaching-learning process will be considered from the theoretical point of view. Various concrete examples will also be introduced to illustrate the possibility of technological approaches for various purposes. These examples, especially those of telecommunication, should not be taken to reflect real practices in any countries at present but they will show some aspects of future-oriented educational technology. Such examples should be evaluated not by their technological novelty but by their substantial contribution to the solution of difficult problems. The attached diagram, "The System of Adult Education and the Modern Media," will illustrate the general framework of this study which has been discussed at previous paragraphs.

Finally, it must be emphasized that the key factor in the use of new modern media in adult education will be the existence of well-qualified educational planners who can design a total system of adult education in accordance with the conditions mentioned in Chapter I, organize an integrated structure of men and equipment and evaluate the educational out-put in terms of financial and human investment. At present, there is no longer any mystical belief in technology, but there is frequently overconfidence in it or prejudice against it. It may be concluded that the utility of new media depends entirely upon the creative thinking of men and can be expanded only to the extent that the process of learning is analyzed more fully.

The System of Adult Education and the Modern Media (provisional scheme)



CHAPTER I

BASIC PRINCIPLES FOR DESIGNING A NEW SYSTEM OF ADULT EDUCATION

1-1. The Problem

We shall avoid discussion of the ever-growing need for adult education or the increasing potential and merits of modern media, assuming that they have been or will be discussed elsewhere. We shall, however, discuss why we must consider modern media specifically in relation to adult education.

Adult education differs from school education in several respects. First, the target group is usually less homogeneous in age, background, and purpose. Second, they are voluntary learners and as such are free to leave when motivation to learn diminishes. Third, the learners may be widely scattered geographically. Fourth, the time schedule convenient for learning may vary from learner to learner. Fifth, there are very few instructors specifically trained for adult education, so that adult education often must be carried out without the skill of qualified instructors. Now, researches show that following factors enhance the effectiveness of learning:

- 1) The learner is adequately motivated.
- 2) The material is adequate to the individual learner in the level of difficulty, content, and mode and pace of presentation.
- 3) The learner is encouraged to respond actively to the presentation.
- 4) The learner knows whether his response is correct at each step, and whether he is making progress throughout the course.
- 5) Adequate personal help is available when he is having difficulty.
- 6) Mild environmental pressure and encouragement to continue effort exists, e.g., the presence of peers working on the same learning task.
- 7) There is social incentive for successful learning.
- 8) There is an adequate level of arousal.

Problems arise when we want to secure these favorable conditions of learning under the constraints of adult education enumerated above. Some of them can be solved through the use of modern media provided that good software is developed to go with them. Others require a broader social technology.

Suppose that a man running a farm in an isolated area wants to learn elementary electronics. What will the alternative ways of learning be? The

conventional method is to order a textbook and read it. We all know that he will probably give up after the first ten pages unless he is very strongly motivated. If he can use a tape recorded lecture series along with the textbook, the probability that he will continue increases. If he can see the lecturer and demonstration through TV or VTR, this probability will be even greater. If the textbook is programmed with carefully stepped questions so that he can check his own progress, the probability will be still greater. If someone, even one of his friends, communicates with him periodically to confirm his progress and give him encouragement, he will work through all of the material unless he runs into serious difficulty. If there is a guidance programme to show him alternative materials when there is a difficulty, we can almost be sure that he will learn successfully.

Here, however, we have assumed that he is motivated and that he is persistent but these assumptions are not always met. The modern media can be designed to arouse attention, and multi-media stimulation itself will enhance it to some extent. In order to motivate people to begin with, either a social or a material incentive system must be designed. In school education, people recently lay more stress on intrinsic motivation, the pleasure which comes from learning itself. In order to get otherwise occupied adults to use their spare time for specific learning, however, the task has to be related to extrinsic reward. The appeal to intrinsic motivation helps, but it is not sufficient. Sometimes even such artificial social rewards like a diploma or certificate will be useful.

1-2. Expected Functions

Summarizing the foregoing discussion, we shall enumerate the functions expected of modern media in adult education.

- 1) Major agent to present content material to the learner. In conventional classroom instruction, this was the function of the teacher. Often printed materials played this function, but, audio-visual devices may bring presentation closer to individual learners even if they are widely scattered geographically. Some devices allow the learner to request presentation at a convenient time. The materials will be presented in a well-planned, uniform fashion, and the presentation may be made reproducible. The drawback is that the presentation is less readily adaptable to learner responses. If cost is not a problem, computerization can overcome this drawback to some extent.
- 2) Elaborator. When the major presentation is left to the teacher or printed

materials, modern media may be effectively used to supplement the major presentation by providing vivid concrete examples, elaborations, review materials, repetition, etc.

- 3) **Activator.** Researches show that audio-visual presentation is more effective in arousing attention as compared to lectures and printed materials.
- 4) **Communicator.** Audio-visual devices may be used to facilitate communication between the learner and instructor or among learners. This function is obviously beneficial in adult education, where the close daily interaction of the school classroom tends to be missed.
- 5) **Pacer.** Behaviour technology shows that time contingencies between original and conditioned stimuli, between stimulus and response, and between response and reinforcement are crucial factors to effective learning. Mechanical or electronic devices are useful in maintaining optimal pacing.
- 6) **Reinforcer.** This is the function in which modern media usually fall behind a human teacher. However, new teaching machines and computerized system are overcoming this problem. Nonhuman reinforcers sometimes work better than human reinforcers when the learner is selfconscious because it is less threatening to his personality. Adult learners are usually more selfconscious and defensive than school children.
- 7) **Recordkeeper.** Devices which keep records of progress and make retrieval easy are especially useful in adult education, where there are many choice points at which highly individualized decisions must be made.
- 8) **Information retriever.** The information an adult learner may want is far more complex and greater in amount as compared to the information in school subject matter. Well-organized information retrieval is an indispensable part of an effective system of adult education.

No single machine will combine all of the functions mentioned above, and no single machine is the best for every occasion, subject matter and local and individual conditions. To be optimally effective, the introduction of modern media must follow careful and systematic design.

In other words, new media should be introduced as components of a technological system. By a technological system we mean a system which combines parts playing various functions and a software which regulate these functions to maintain the optimality of the total functioning under various conditions. Human operators, instructors, counsellors, etc., may or may not be included in the system.

1-3. The System and the Environment

The effectiveness of any system depends on the relationships between the system and its environment. A technological system in adult education is no exception. It is optimally effective only when it is designed after taking into account the various social and psychological factors operating at the time and place. This section will discuss some of these factors to be taken into account before actually investing a large amount of money in hardware.

- 1) Needs. The first environmental factor to be analyzed is educational needs. There are two sets of needs. The first set belongs to the society, the country, the government, or the institution which is responsible for the installation of the technological system. The need may be for functional literacy, technical skill, industrial know-how, intellectual leadership, international understanding, or sometimes even political indoctrination. The second set of needs belongs to the people who profit or sometimes suffer from the education given through the system. The need may be for survival, better living, better income, social prestige, peer approval, achievement, or even that based on intrinsic exploratory motives.

A careful study of both sets of needs at the local level is a prerequisite for the design of an educational technological system. Especially when there is a conflict between the two sets, the system will not function effectively unless a means of resolving this conflict is incorporated into it. If the government wants higher literacy when the target people do not feel a need for it, the educational system must provide either good persuasion to make people want literacy or some extrinsic reward to go along with learning. Persuasion works well when the learners are a captive audience. When they are not, extrinsic motivation and incidental strategy is needed, at least at the beginning stages. When there is no conflict between the purpose of those providing the education and that of those receiving the education, a straightforward introduction into a tight instructional programme with a built-in system of feedback concerning progress will work.

As the method for diagnosing the needs of the people, tests and questionnaires developed for a different culture will not be appropriate. Probably interviews in depth on a smaller sample by trained interviewers will bring us closer to the truth.

- 2) Constraints. The amount of available money is always a prominent constraint. There also are more subtle constraints which have to be studied at the local

level. For example, how are the houses built? Do they provide space suitable for individual learning or do the target people have to go to a meeting hall for any concentrated learning? Can women claim the same opportunity for learning as men do? What time of the day is the target group free for learning, and for how long? What kind of power source is available? Are teachers or specialists to guide learning and to operate the system available? Can the people afford to pay part of the cost of learning? What kinds of learning facilities which may supplement or compete with the system are available there? Is the dialect radically different from the standard national language? The system has to be adapted to most of these constraints. Some of the constraints have to be removed or remedied before introducing the system. The philosophy, content, and method of education under which the target population was brought up, the method and media of mass communication to which they are accustomed, and various other background factors constitute loose but important constraints. A method highly similar to conventional school instruction may differ in its effectiveness according to the actual school experience of the target population.

CHAPTER II

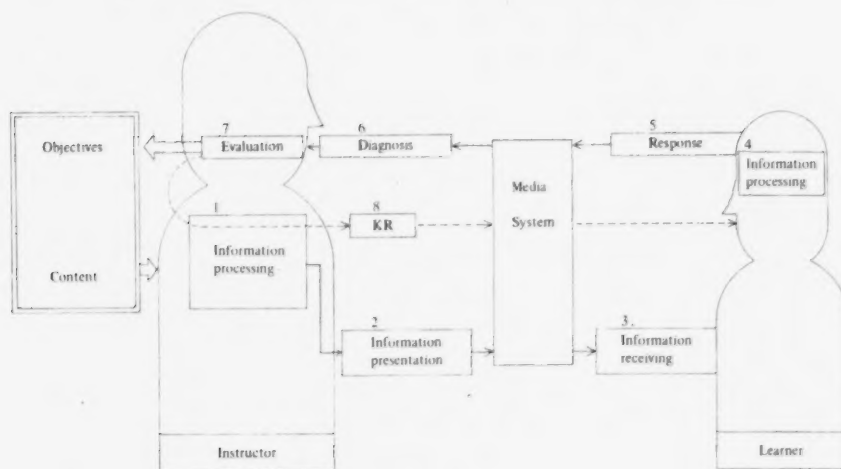
TEACHING-LEARNING PROCESS AND TECHNOLOGICAL INNOVATIONS

2-1. Teaching-Learning Process

It is essentially desirable that learning is carried on of one's own accord. That is, each learner is desired to undertake all aspects of learning by himself, ranging from discovery of problems and methods of their solution to their actual solution and evaluation of the results of study. And, by accumulating experience in such a process, he will be able to gradually improve his behavior.

A particular teacher is not always required in this process. The learner needs only regular access to information resources equipped with various materials to help him solve problems. In most cases, however, it is impossible for him to undertake by himself all aspects of learning as stated above. Cases also occur frequently where the learner fails to find the right method of solution, even if the problems are identified, or where he is unable to judge whether the solutions he produced are right or wrong. This is the reason why it is considered necessary for an instructor to help the learner identify the problem exactly, present him with guidance for its solution, and evaluate the results of his efforts. The fundamental process of this interaction between the instructor and the learner is shown in Figure 1.

Fig. 1. Position of the Teaching-Learning Process and Media System



In this process, the instructor establishes the instructional goals, selects the instructional content, makes teaching plans, and presents information to the learner. Upon receiving information from the instructor, the learner thinks and acts by himself. Then the instructor diagnoses and evaluates the learner's learning behavior, informing him of the results of the evaluation.

By setting up this formula of three-way communication, namely, first from the instructor to the learner, second from the learner to the instructor and then from the instructor to the learner, both the instructor and learner become able to go through the process of teaching-learning with confidence. In this regard, the learner's response is essential not only to enable the instructor to evaluate it but also for developing the learner's response into a constructive one.

"Knowledge of Results" (KR) also plays a big role, depending on its form, in having the learner deepen his understanding, master the skill, and facilitate his motivation for achievement.

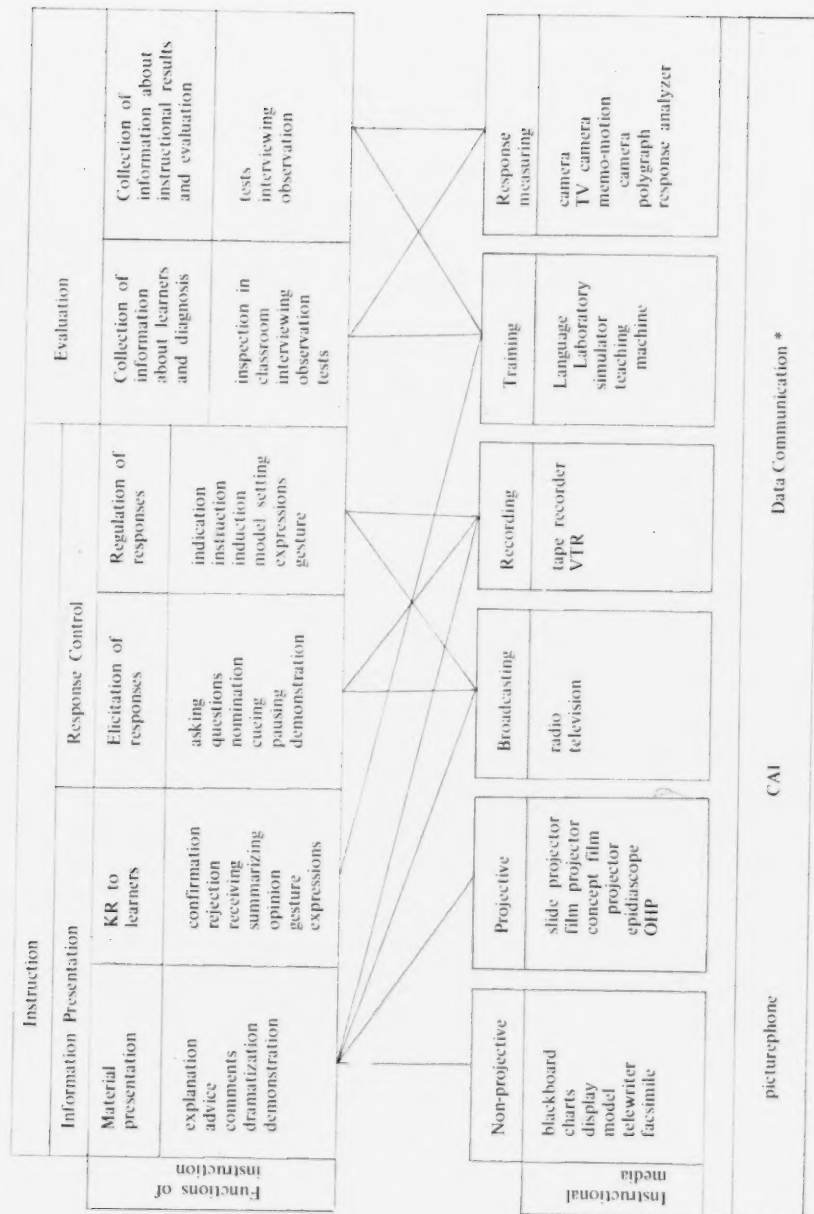
2-2. Technological Innovations and Expansion of Instructor's Functions

Machinery and equipment help to partially expand the ability of human beings. Eye-glasses, telephones, vehicles, and computers help as extensions of the eyes, mouth and ears, legs, and brain, respectively, to expand the respective functions. In the same way, educational equipment and instruments may be considered as helping to expand part of the educational activities.

For example, image presentation devices such as slides, motion pictures, television, OHP (Overhead projector), etc., help to expand part of the functions of presenting information and the instruments for observing and recording responses such as response analyzers, GSR (Galvanic Skin Response), TV cameras, etc., help to expand the functions of observing learner behavior. Information processing equipment such as electronic computers, response diagnosing apparatus, etc., help to expand the functions of processing and assessing information.

There are thus various types of equipment and devices which help to expand the diverse functions of instructors. At the moment, however, there are also some functions which cannot be improved by special equipment. These functions are related to the presentation of human feelings such as the warm consideration, expressions, gestures, etc., of instructors. In the case of man-to-man instruction, these functions often play important roles as vital bonds linking the instructor to the learners. It is also difficult to read and perceive the learner's gestures,

Figure 2. Relationship of Instruction's Functions with Instructional Media.



* Data communication is a form of telecommunications linking numerous remote data terminal equipments with a centrally located computer. In Japan, the term "data communication" is regarded as integrating the concepts of "data transmission" and "data processing". Data communication has already been in service provided by NTT.

expressions, and feelings with equipment and instruments. Equipment and instrument also can not produce the goals or programs which may develop creativity. This means that certain important functions of education are unavoidably sacrificed by mechanization. Figure 2 indicates the instructional functions the instructor should emphasize and the instructional communication media to be used more fully.

Figure 2 not only indicates the relationship of instructional activities to instructional equipment, but also suggests to use adaptive media. For example, an instructor who gives a good lesson of the learning-by-discovery type without using any instructional equipment often can not develop his lesson well by using television, despite the great increase in information presentation, KR and evaluating function should fail to be incorporated into the process of instruction. In order to avoid such a danger, each instructor should learn what types of instructional media assist what sort of instructional activities and re-arrange the process of his instructional activities in adaptation to the particular used media.

Recent use of new techniques in radio, TV, and telecommunication serves to improve the above-mentioned three-way communication. Needless to say, such techniques were not developed as the means of meeting the demand from educational circles. It is rather the case that the results of general technological innovations are applied in actual instruction only after they effectively demonstrate their advantages in the entertainment field and in daily life.

Nonetheless, there is no denying that such new technology functionally improves the three-way communication in the teaching-learning process.

2-3. Role of Broadcasting

Educational broadcasting has contributed immensely to the improvement and increase of educational opportunity. At kindergartens, elementary schools and secondary schools, educational broadcasting has especially improved the educational environment. It has enabled each learner to contact, through projected images, the world, transcending the time, space, and the phenomenal world, which can not be experienced within the sphere of daily life. Needless to say, such a world is similar to, but not exactly the same as, the real world. But once the learner has gained such experiences through images, he should be able to adapt his behavior in the similar experiences he may have in the future. The same should apply to broadcasting in adult education.

Conventional broadcasting, however, does not result in adequate constructive

responses among all the audience. There must be many viewers who feel, when watching and listening to TV and radio programs, that they have understood the information, but there is no guarantee that such a feeling will be reflected in their actual behavior as a constructive response.

In order to develop constructive response among the audience, it is important to have them try to solve problems on their own initiative and to furnish them with the conditions for the prompt acquisition of the necessary information while constantly evoking a response and regularly sending relevant information back to them through the broadcast.

2-4. Role of Telecommunication

The telecommunication technology has also proved helpful in the improvement of educational opportunity. The telephone, in particular, has made an enormous, though not very visible, contribution to learning in adults. Whenever the question arises, a learner can obtain the necessary information by asking about it from people at various types of service organizations by telephone. In U.S.A. attempts have also been made to provide for the availability of recorded instructional materials by means of remote access equipment.

Generally speaking, the contribution of telecommunication technology to adult education is expected to grow remarkably in the future. Because it is expected in the not too distant future that an information service network will be formed between instructional information resources and such learning places as homes, worksites, learning centers, etc., as a result of the introduction of facsimile, video-telephone, data communication, on line CAI, etc. When such a day comes, every learner will be able to continue his learning activities on his own at any time and place he chooses while selecting and using the type of information he needs.

2-5. Development of Information Package

Broadcasting can simultaneously present the information to plenty of unspecified people in remote regions, but functions as one-way communication, unless its receiver employs certain special aids.

Telecommunication helps establish two-way or three-way communication between those specified learners living in mutually distant regions, but the information transmission is transitive, and the technical difficulty is involved in undertaking simultaneous communication among many people through telecommunication.

On the other hand, the information, permanently preserved in the information package, can be transmitted to each receiver, whenever he requests, by various means of transportation and by cable at times. Both the instructor and learner can repeatedly use such information package. In other words, the information package is able to overcome time by increasing the amounts of their memories.

It has been carrying greater importance in adult education these days as the development of software such as audio cassette tape, video cassette tape, and instructional material kits. However, it means a sort of recording technology, including with various sets of conventional instructional information such as the printed materials like books, newspapers, magazines, pamphlets, etc. and the audio-visual materials like films.

This information package has to be completely prepared in order to ensure successful information retrieval and above various information services through broadcasting, telecommunication, and transportation. Particularly in learning in adults with large individual differences, it will be essential to prepare the storage of information package that could meet a wide range of requests.

2-6. Multi-Media

In adult education in the future, the technology of broadcasting, telecommunication, and information packaging will be combined in various ways for use as multi-media.

For example, a learner who received information via a university of the air will learn by requesting reference materials by cable at his office, home, or a learning center and by retrieving the package and receiving additional information from an instructional information center. And those who have missed a certain TV lecture may request a video package for viewing at a learning center. Such combined use of various types of media is foreseen.

With the gap of space and time between the instructor and learner eliminated in this way by means of broadcasting, telecommunication, and information packaging, adults will be provided with increased opportunity for study.

Consequently, instructors in the future should not be merely users of such new instructional communicating technologies but develop themselves into system designers who are capable of designing systems with effective arrangements of such techniques in the teaching-learning process. At the same time, they will have to aid the learner as counsellors when they fails to obtain the proper optimal instructional information by themselves. Instructors will also have to deal with the causes of

difficulties which the learner meets.

CHAPTER III

USE OF NEW INSTRUCTIONAL COMMUNICATION TECHNOLOGY IN ADULT EDUCATION

3-1. Classification of New Instructional Communication Technology

In Figure 3, new types of instructional media assumed to be contributory to adult education are classified according to their characteristics. It was compiled by classifying the types of transmitted information into auditory, visual, and audio-visual information, the type of communication media into broadcasting, telecommunication and transportation, and type of information transmission into one-way, two-way, and three-way communication. For example, broadcasting is a one-way communication technique for transmitting auditory information to a receiver through broadcasting, while telewriter is a three-way communication technique for transmitting visual information to a receiver through telecommunication. All of these media have been and will continue to be utilized widely in order to increase opportunity in adult education in terms of both time and space.

3-2. Use of Broadcasting

Figure 4 indicates that the function of information presentation is increased by

Figure 4. Broadcasting Education

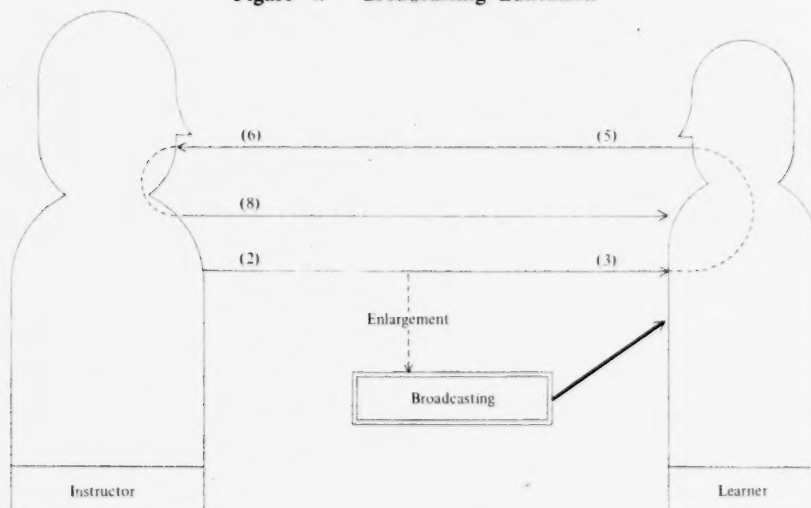


Figure 3. Classification of Instructional Communication Media
(NHK 1968)

Channel of Communication	Transmission					Transportation	
	broadcasting		telecommunication				
Type of Communication Type of Information	one-way	3-way	one-way	2-way	3-way	one-way	3-way
Auditory	micro- phone broad- casting			remote access audio equip- ment	telephone trans- ceiver	tape	
Visual	facsimile broad- casting static image broad- casting	telegram	facsimile telewriter	facsimile telex	facsimile telex telewriter telegram data commu- nication	printed matter	mail
Audio- Visual	TV	CAI broad- casting	Cable TV	remote access VTR	CAI video- telephone	film video package	

educational broadcasting. Radio and television may be considered as very useful media for the simultaneous dissemination of information to a large number of people.

Excellent programs help to improve the instructor's information presenting functions.

Table 1 shows a part of the results of a national survey conducted in July, 1968, by the NHK Public Opinion Research Institute with men and women of the 16-69 age group. It indicates that the better their school background is, the higher their desire for educational radio and TV programs.

Table 1. Adult Desire for the Use of Broadcasting

	Lower Secondary School Graduates	Upper Secondary School Graduates	University Graduates
	1,073 persons	723 persons	158 persons
Desire to use	38%	62%	72%
No desire to use	57%	3%	27%
Don't know	5%	22%	1%

Table 2 indicates that, in regard to the desired content, liberal arts and cultural subjects are highly preferred by both men and women, professional knowledge and technical education by men, and knowledge helpful in everyday life and housekeeping by women. (For Table 2 see page 16)

Table 3, which is also from the same survey mentioned above, presents the reasons why the use of radio and TV programs is planned. It indicates that such reasons as "being able to study at the time and place one chooses" (60%), "the content is valid" (35%), etc., assume a larger proportion, and that such a trend is noticeable particularly among housewives of middle age and over. It will be extremely important in adult education in the future to provide media, through which people can learn while at home. (For Table 3 see page 17)

Figure 5 shows that, in correspondence education, the three-way fundamental teaching-learning process is improved by use of mail. The instructor mails to the learner letters, tapes, video-tapes, etc., to which the latter responds by sending

Table 2. Desired Content by Sex and Age

(NHK 1968)

		Total	Classification by Sex and Age							
			Men				Women			
			Men Total	16- 19	20's- 30's	40's- 60's	Women Total	16- 19	20's- 30's	40's- 60's
Number of those wishing to study		1151	467	59	249	159	684	78	369	237
Desired Contents of Learning	a. Language courses	15.8%	21%	(36)	23%	13%	12%	(32)	14%	3%
	b. Music education	9.1	9	(24)	8	4	10	(22)	10	4
	c. Special education	3.0	2	(0)	2	2	4	(1)	4	4
	d. School broadcasts, upper secondary school corre- spondence course, general course	8.6	6	(15)	6	4	10	(13)	13	5
	e. Professional knowledge, technical education	25.2	43	(27)	44	47	13	(12)	14	12
	f. General cultural subjects	50.3	49	(46)	51	47	51	(56)	54	45
	g. Knowledge useful in every day life and housekeeping	49.6	14	(7)	12	21	74	(29)	79	80
	h. Hobby	18.2	22	(19)	20	26	15	(6)	15	19
	i. Sports, recreation	12.6	24	(37)	28	11	5	(12)	5	4
	j. Others	2.2	2	(2)	2	3	2	(5)	2	2
k. "Don't know" and no answer		1.7	1	(2)	2	1	2	(1)	2	3

reports to the instructor, who, in turn, corrects them and mails them back to the learner with KR. In adult correspondence education in Japan, a large number of courses exists in three fields: the clerical field, technical field, and life-culture field. The number of such courses alone, as approved by the Ministry of Education, amounts to 162, including 44 clerical courses, 84 technical courses, and 34 life-culture courses. (For Figure 5 see page 18)

Shown in Table 4 are the results of a random-sample survey of 20,000 learners concerning the reasons why they presented reports (response rate was 40%). The reason "An end can be put to the study of a certain unit." was the most common with 35.8% of the total followed by "I want to obtain correction and guidance." (For Table 4 see page 18)

Table 3. Reasons why use of radio and TV programs are planned

	Total	Men, classified by age			Women, classified by age			Classified by Profession						
		16-19	20's-30's	40's-60's	16-19	20's-30's	40's-60's	Farmer	Self-employed	White collar	Blue collar	Housewives	Students	Unemployed
		{	}	}	{	}	}							
(Number of those planning use of radio and TV programs =100%)	501	30	105	73	27	154	112	61	35	73	115	128	55	14
Reason														
a. It is inexpensive	30.7	%	34.3	26.0	%	28.6	35.7	26.2	%	41.1	21.7	32.0	32.7	*
b. It is easy to begin or give up	31.3	*	28.6	24.7	*	31.2	38.4	39.3	*	28.8	22.6	33.6	29.1	*
c. Study can be made at any time and place one chooses	60.3	*	58.1	46.6	*	64.9	68.8	62.8	*	54.8	54.8	73.4	49.1	*
d. There are few other opportunities available for study	30.1	*	31.4	34.2	*	27.9	35.7	36.1	*	32.9	34.8	31.3	14.5	*
e. Study can be made regularly	16.2	*	17.1	16.4	*	13.0	14.3	4.9	*	20.5	15.7	14.1	29.1	*
f. Study can be made with more interest than under any other method	22.6	*	23.8	21.9	*	20.8	25.0	23.0	*	26.0	20.9	21.1	25.5	*
g. Subjects and level of learning are more acceptable than in case of other types of learning media	16.2	*	9.5	24.7	*	14.3	20.5	21.3	*	15.1	13.0	14.1	16.4	*
h. Contents are trustworthy	35.1	*	35.2	47.9	*	27.9	37.5	18.0	*	32.9	35.7	34.4	32.7	*
i. Access to first-rank instructors is possible	31.1	*	34.3	28.8	*	29.9	37.5	27.9	*	31.5	29.6	34.4	27.3	*
j. Other people recommended	2.6	*	1.0	4.1	*	1.9	1.8	4.9	*	1.4	2.6	0.0	7.3	*
k. Other reasons	0.6	*	0.0	1.4	*	0.0	0.9	0.0	*	0.0	0.9	0.8	0.0	*
l. "I don't know." and "No reply"	1.2	*	1.0	1.4	*	1.9	0.9	1.6	*	2.7	2.6	0.0	0.0	*

Figure 5. Correspondence Education

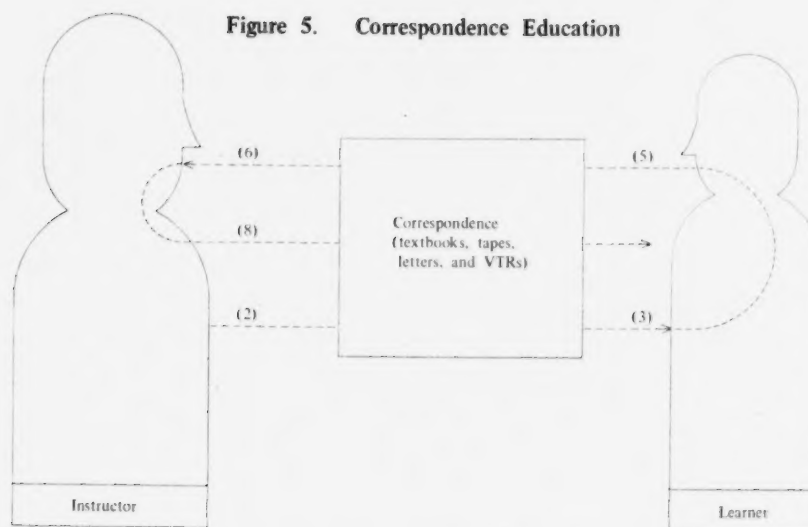


Table 4. Reasons for Presentation of Reports on Given Themes
(Japan Social Correspondence Education Association, 1971)

Field Reasons	Clerical		Technical		Life-Culture		Total	
	Number	%	Number	%	Number	%	Number	%
a. I want to obtain correction and guidance	718	21	150	15	585	33	1,453	23
b. It was pleasant to prepare reports	235	7	91	9	249	14	575	9
c. An end can be put to the study of a certain unit	1,441	41	311	30	508	29	2,260	36
d. I want to acquire a qualification certificate	589	17	326	31	190	11	1,105	18
e. I want to acquire a diploma	241	7	58	6	94	5	393	6
f. I was urged to submit a report	35	1	4	0	8	1	47	1
g. I was stimulated by an article in a magazine	62	2	10	1	31	2	103	2
h. I was encouraged during schooling and study meetings	11	0	6	1	27	2	44	1

Table 5 shows the results of a survey learner response to the instructor's KR. It indicates that those who considered the instructor's KR as helpful in attaining the learning goals, as represented by such answers as "I've realized how inadequate my effort was" (30.3%) and "I became aware of the level of my ability" (24.9%), were more common than those who answered "My zeal for study was increased." (17.7%). On the other hand, out of the Minister of Education prize winners, those who answered "My zeal for study was increased," was most common at 30.8%, while those who considered instructor's KR helpful in attaining their learning goals did not account for a very large proportion.

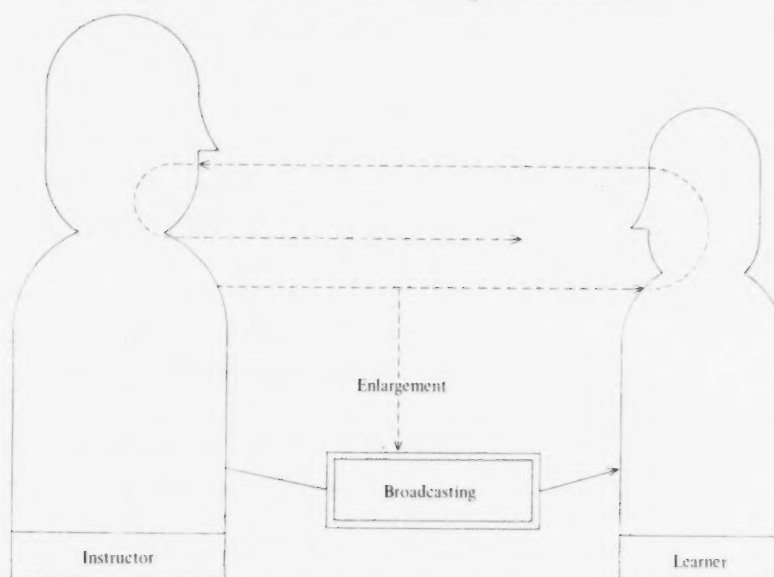
It is thus considered very important in adult education to increase the learners' willingness to study by means of promoting three-way communication between the instructor and learners.

Figure 6 shows the process of increasing the effect of information presentation to the learner with radio and television in correspondence education. In ordinary

Table 5. Learner Responses to Instructor's KR

Field Reasons	Clerical		Technical		Life-Culture		Total	
	Number	%	Number	%	Number	%	Number	%
1. My zeal for study was increased	673	18	176	14	480	20	1,329	18
2. I've realized the value of Ministry of Education approved social correspondence education	352	9	160	13	412	17	924	12
3. I've realized the level of my ability	907	24	331	26	602	25	1,840	25
4. I've realized how inadequate my effort was	1,062	28	473	38	719	30	2,254	30
5. I did not feel anything in particular	638	17	66	5	65	3	769	10
6. I lost the desire to present the next report	45	1	10	1	41	2	96	1
7. Others	112	3	35	3	76	3	223	3
Total	3,789	100.0	1,251	100.0	2,395	100.0	7,435	100.0

Figure 6. Radio and TV Correspondence Education



educational broadcasting, a radio or TV teacher is different from a classroom teacher, whereas in this case a correspondence education instructor personally appears on radio or TV, so that he can present the information to many learners directly and simultaneously through audio-visual images. The number of learners can also be greatly increased since broadcasting is employed.

The instruction will be more effective if feedback from learners to the instructor and the KR from the instructor to learners is further improved by introducing new techniques.

Radio and television have a much larger power in correspondence education, which is provided to geographically dispersed learners, than in the school education, which is provided to learners concentrated in one place.

In present-day Japan, in addition to regular school radio and TV programs, special radio and TV programs are broadcasted every day for the benefit of students enrolled in the upper secondary school correspondence course, so as to enable them to study all compulsory subjects. These programs are said to be watched and heard not only by such students, but also by more than 100,000 adults. The "Computer Course" which has been broadcast by NHK for several years has also been watched by roughly 1 million people at their homes and offices. In addition, the campaign calling for "effective use of broadcasting in life," which is now under way, is hoped

to play a large role in the field of adult education as well.

Another NHK program, "University of the Air for Citizens," is also very popular.

The "University of the Air in Japan" program began to be test-broadcasted in 1971 by N.S.B. (Nippon Shortwave Broadcast) Station via short-wave radio and was broadcast in 1972 by NHK via UHF-TV. Four subject areas are included: engineering, management, home economics, and literature. According to the "Survey on the University of the Air" conducted by the Ministry of Education in 1970, as many as 17 million people expressed a desire to study through this particular program. Out of them, 1.2 million people "wished to use it as a regular student," 3.2 million "wished to use it only for certain subjects," and 1.26 million "wished to use it without worrying about the acquisition of credit." These figures illustrate the great expectation placed on adult education through radio and television.

In view of the stronger interest in learning shown by those people with better school background indicated in Table 1, we can safely predict that the number of those desiring adult education will continue to grow in the future in line with the improvement of the educational level of the people. Consequently, it will be very important to develop new techniques that will make education feasible for geographically dispersed adults.

Coaxial cable television will make possible simultaneous transmission to any desired channel via one cable. It not only transmits the relayed video-recorded pictures, but also broadcast sustaining programs. Accordingly, adult study can be aided by using local programs in addition to the national programs for adult education. And by connecting it with other CATV systems, the content of the programs can be enriched. Furthermore if the function of two-way communication is established by dividing the frequency or time, it will become possible to provide CAI from local broadcasting centers and instructional information centers, and even to provide for the retrieval of information.

3-3. New Technology for Information Transmission — Facsimile and Telewriter

New telecommunication technology is designed to increase educational opportunity by improving three-way communication in the teaching-learning process in terms of both time and space. In adult education, courses must be provided which are adapted to various requests of many adults who have differing demands for study and different personalities. The new telecommunication

technology will play a large role when such courses are provided to many learners at the same time.

New telecommunication technology has recently been developed, such as facsimile and telewriter, which can communicate and record characters, figures, pictures, and still images, their application in adult education is also expected in the future. For example, it will become feasible to aid the learner by transmitting various types of educational information (charts, maps, results of computation, calligraphy, musical scores, memos, etc.) to homes and the learning centers of enterprises, public halls, etc., from distant educational centers and vocational training centers, or conversely to have learners receive via facsimile various types of instructional information in the form of printed material by contacting any library or instructional information service center.

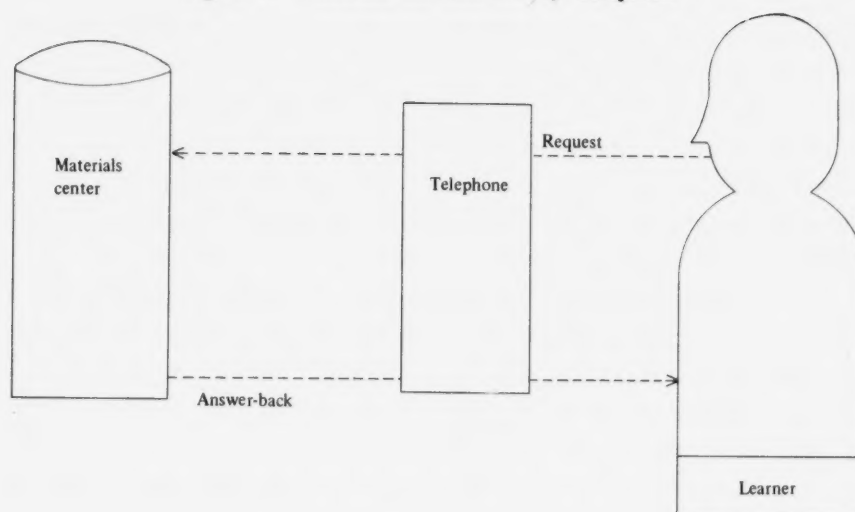
While facsimile makes it possible for images and written materials prepared in advance to be reproduced in the original form after being transmitted, telewriter reproduces the operation of the instructor's pen on the receiver's equipment time serially in its original form. By combining it with a telephone, drawings, maps, schemata, human images, numerals, etc., which can not be described by sound and voice alone, can be visually transmitted with ease and accuracy. If they are reproduced on the screen of a remote learning center, written material and figures can be displayed through tele-control.

3-4. Information Retrieval by Means of Telecommunication Technology

A voluntary learning attitude on the part of learners is very important in adult education. Unless proper materials and information are available, however, a voluntary positive learning attitude will not necessarily produce fruitful results. Consequently, it is imperative to keep appropriate resources and means well arranged so that pertinent learning materials can be presented on time. Information resource centers, instructional information centers, etc., will have to perform this particular function.

Figure 7 shows the process of learner information retrieval by telephone when he studies on his own initiative. In the course of solving a problem, he can promptly obtain the necessary information through telephone or facsimile by asking at the materials center by telephone. When many learners telephone the materials center at the same time for information, however, there it is possible that all the telephone calls will not be handled smoothly so that learners may have to wait for

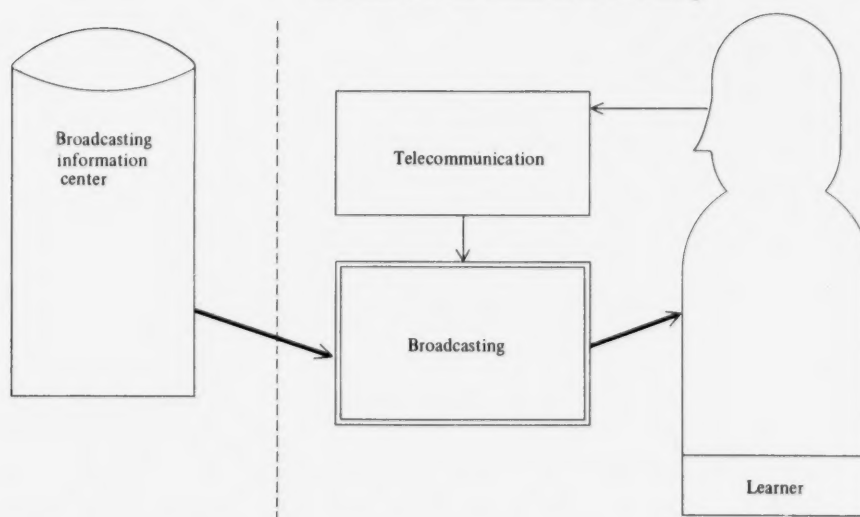
Figure 7. Information Retrieval by Telephone



a long time.

The system of information retrieval through static image transmission in Figure 8 is designed to correct this drawback of information retrieval by telephone, thereby consistently enabling many learners to retrieve a lot of information at the same

Figure 8. Information Retrieval by Static Image Transmission and Facsimile Broadcasting

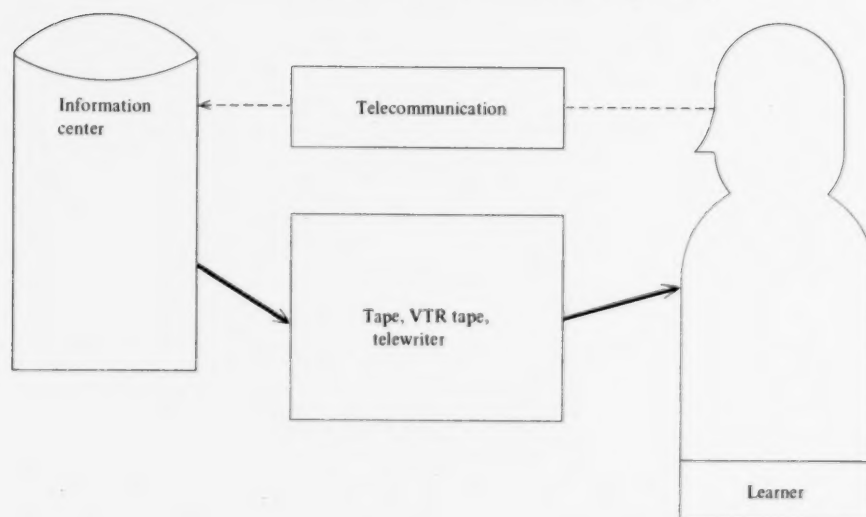


time. It will be more effective if this system is combined with facsimile broadcasting which makes the necessary printed information available to learners. This new technology is not only useful in retrieval of the data necessary for study in each subject area, but can also be widely applied to rapid and extensive distribution of the newest public information and notifications related to education. That is, the scope of possible application is very broad. Since a terminal unit is located near the telephone receiver, the request and selection of information will actually be made between the receiver and the terminal unit.

Figure 9 shows the remote access transmission of instructional information, in which such information as sound-recorded tapes, VTR tapes, handwritten materials, etc., flow out of the information center at the request of the learner. It is technically possible only if the particular learner is linked to the information center by closed circuit, but it is too expensive to increase the amount of information that can be made available at the same time. Therefore, the problem after development of techniques for still image transmission will be to develop new telecasting techniques for rapidly providing as many learners as possible with a wide variety of moving images at low cost on request.

In addition, information retrieval through data communication can be used to retrieve necessary information from the information center at any distant terminals.

Figure 9. Reception of Dynamic Information through Remote Access Communication System



While it is utilized for the clearing of reference materials, etc., in the U.S., it will also prove useful in adult education.

3-5. Expansion of Three-Way Communication by Means of New Telecommunication Technology

The formation of three-way communication between the instructor and learner is of utmost importance in education. In adult education, three-way communication must be established in some form or other between the instructor and each of the learners, who are dispersed in both space and time. Some examples are shown in Figure 3. The telephone is one of the most popular media meeting this purpose, making it possible to establish three-way communication between the instructor and learners who are located in distant regions through the exchange of auditory information. For example, a learner can telephone the instructional center to inquire about instructional information, hear instructor's explanations, or study a language through its language laboratory. If a loudspeaker is connected with the telephone, all of the learners can receive instruction from an instructor at a learning center. If a switching equipment is employed, more than two learners in different locations can listen to the lecture of one instructor at the same time and learning activities can be carried out through three-way communication between the instructor and learners. In this case, if a loudspeaker set is set in each terminal, many learners can take part in the same learning activities.

A push-button telephone can be used to have calculations made by the computers of various centers by calling those centers from home, or can be used in simple CAI. TALS of Japan (Dendenkosha Immediate Arithmetic and Library Service), DIAL-A-DRILL in the U.S., etc., are examples of such applications. Video telephones will also be very useful in adult education. They make possible audio-visual three-way communication between the instructor and learners in distant places. Learners can not only receive adequate KR from the instructor, but also fully observe numbers, formulae, drawings, techniques, experiments, etc. If a learning center is connected with a university, hospital etc., the video telephone can be used as an instructional medium similar to CATV. Needless to say, it will make a great contribution to adult learning if it is utilized in CAI or in conferences.

A data communication system is generally utilized in the following ways:

- (1) To exchange through a central electronic computer a large volume of information produced at different places for transmission to respective destinations.

- (2) To collate from a remote spot or renew, when necessary, information recorded in the random access-type large-capacity memory of an electronic computer.
- (3) To have a central large electronic computer make various simultaneous computations with a large number of remote input and output apparatus.
- (4) To have a central electronic computer watch and control the flow of work on the spot of production.
- (5) To make combined use of the above mentioned functions. With a data communication system, not only the equipment for exclusive use in it, such as the keyboard printer, CRT (Cathode-Ray Tube) character display, optical character mark-sense reader, etc., but such terminal equipment in other types of communication system as the telephone set, TV set, facsimile set etc., can also be used as the terminal equipment for access to an electronic computer from remote places.

In adult education, a data communication system can be utilized in the following ways:

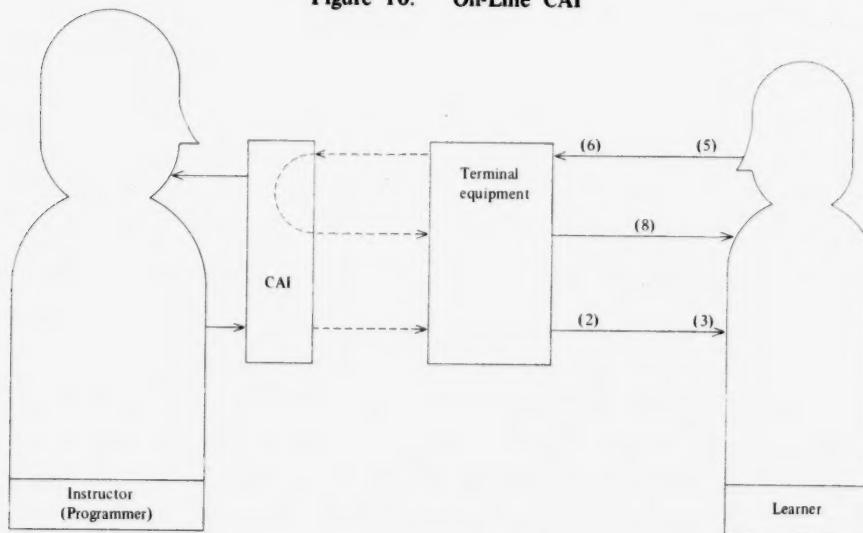
- (1) To collate and obtain, when necessary, various types of learning information from the electronic computer of the instructional information center, through the terminal equipment (keyboard printers, CRT character displays, facsimile sets, push-button telephones, video telephones, etc.) installed in enterprises, public halls, and so on.
- (2) To provide vocational and technical trainings in the piloting of airplanes, driving of motor vehicles, operation of machine tools, etc. an electronic computer at a vocational training center can watch and control the process of training simulators installed in enterprises, schools, or clubs.
- (3) Through access to the electronic computer of an instructional information center or the science and engineering computation center through the terminal equipment (keyboard printers) installed at worksites, public halls, schools, etc., the system can be used in learning such subjects as mathematics, statistics, physics, engineering, etc., where the computation of high level or large volumes of data is required, according to programs previously stored in the computer or programs prepared by the learners themselves.
- (4) Through access to the electronic computer for CAI at an instructional information center from the terminal equipment (CRT character displays,

TV sets, video telephones etc.) at homes, etc., mathematics, natural science, foreign languages, etc., through dialogue with the electronic computer. This method of studying will result in special expansion of a CAI.

Figure 10 shows how CAI operates. If a learner shows his response to a question presented by slide, film, CRT, etc., on the CRT with a light pen or through the keyboard, ΔR is sent back to him on CRT, slides, or in typewritten letters. If a computer and communications circuit are provided, it could simultaneously aid the study of more than two learners in remote places. In Japan, Association of the Promotion for Machine Industry, has 30 terminals, eight of which have each CRT display and 22 of which have each keyboard and printer. This spring, it has started to provide the course of study on six subject matters for adult education, namely, FORTRAN, COBOL, NC Machine Tool, Colour TV, Introduction to Computer, and APT (Automatically Programmed Tool). If a computer and communications circuit are provided, it could simultaneously aid the study more than two learners in remote places. In Japan, on-line CAI has also been put to practical use by IBM Japan and Nippon Telegraph & Telephone Public Corporation, though in small scale.

It can establish the basic type of teaching-learning process simultaneously between the instructor and each of many learners in distant places, so that all people should theoretically be able to receive education adapted to their individual needs at any

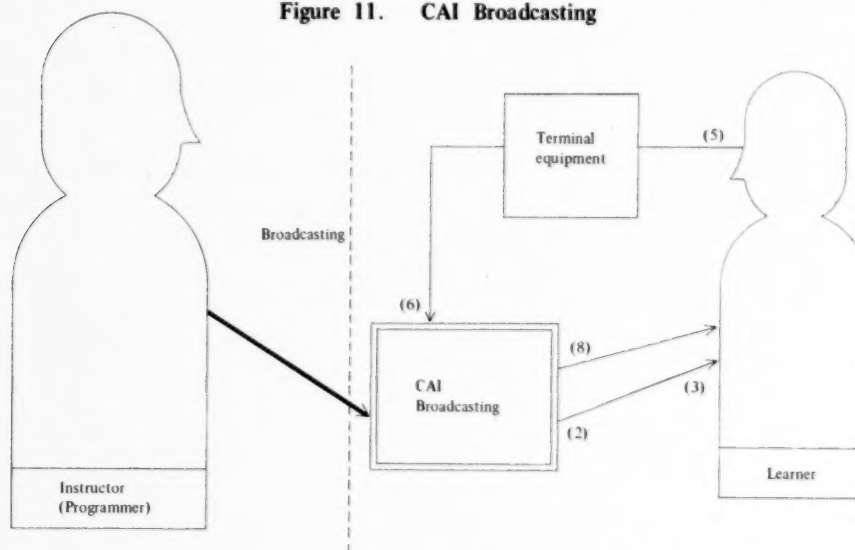
Figure 10. On-Line CAI



time and places. But it will be financially difficult to increase the number of learners unless special financial steps are taken by the Government.

On the other hand, the TV type CAI broadcasting as shown in Figure 11, increases almost endlessly the number of learners in every sphere to which broadcasting can be transmitted, by having terminal equipment provided for the learners. If each learner indicates on the terminal equipment his response to the problems presented by a TV monitor, the corresponding KR indicating whether his response is right or wrong and the following questions are presented. For learners, the process is the same as that of CAI. For a transmitter, however, it involves little technical difference from the broadcast of still images, since it is only necessary to send out many static images onesidedly. It is not CAI in the true sense, but may be called quasi-CAI utilizing broadcasts. For individual learners, however, it is the same as with the information being presented to continuously in reaction to responses.

Figure 11. CAI Broadcasting



3-6. Characteristics of New Instructional Communication Technology

Table 6 indicates the results of an evaluation of the instructional characteristics of various broadcasting and telecommunication techniques, as described above 30, items were tentatively evaluated for each technique with respect to instructional activities, assisting learners, suitable objectives, cost, and problems involved in use. Two types of established broadcasting methods as employed in TV-radio education and TV-radio correspondence education, two types of established tele-

Table 6. Characteristics of Instructional Media

		Existing Broadcasting Techniques		Existing Telecommunication Technique		News Broadcasting Techniques			
		Correspondence education by Broadcasting in Education		Remote access		Video Telephone	Facsimile CAI	Televised still picture	CAI Telecasting
Instructional function	Material presentation	⊙	⊙	⊙	⊙	⊙	○	⊙	⊙
	Knowledge of results	x	Δ	x	○	⊙	⊙	x	⊙
	Arousing of responses	⊙	⊙	○	⊙	⊙	⊙	x	⊙
	Regulation of responses	○	⊙	○	⊙	⊙	○	x	⊙
	Diagnosis and evaluation	x	x	x	○	⊙	⊙	x	○
Assistance to learning	Information acceptance	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙
	Information processing	○	○	○	⊙	○	⊙	○	○
	Response to information transmission	x	x	x	○	⊙	○	x	Δ
	Response to instructor's answer	x	x	x	○	⊙	⊙	x	○
	Controlling response	x	x	x	○	⊙	⊙	x	○
	Self-evaluation	○	○	○	○	○	⊙	○	⊙
	Information retrieval	x	x	⊙	Δ	○	⊙	⊙	○
	2-way communication	x	x	Δ	○	⊙	⊙	Δ	○
	3-way communication	x	x	x	○	⊙	⊙	x	○
Objective	Knowledge	○	⊙	○	○	○	⊙	⊙	⊙
	Skill	x	○	⊙	○	○	○	x	○
	Ability	○	○	○	⊙	○	○	Δ	○
	Attitude	⊙	○	Δ	⊙	○	○	x	○
Cost	Cost	Δ	Δ	x	Δ	○	x	?	?
	Running cost	⊙	○	○	Δ	○	x	?	?
	Number of learners	⊙	⊙	○	Δ	Δ	Δ	⊙	⊙
	Cost/Nr. of learners	⊙	○	Δ	○	○	Δ	○	○
	Preparation	○	○	Δ	Δ	Δ	x	x	x
	Preservability	○	Δ	⊙	○	Δ	○	⊙	○
	Repeatability	x	Δ	⊙	⊙	Δ	⊙	⊙	⊙
	Use of existing systems	⊙	⊙	Δ	○	○	Δ	○	○
Use	Ease	⊙	⊙	○	○	○	Δ	○	○
	Practicability	⊙	⊙	○	○	○	Δ	○	○
	Individual learning	○	⊙	⊙	x	⊙	⊙	⊙	⊙
	Group learning	⊙	○	Δ	○	Δ	x	Δ	Δ

communication techniques as employed in remote access information retrieval and CCTV-ITFS (Closed Circuit Television-Instructional Television Field System), and four types of new instructional techniques as employed in CAI, static image transmission and facsimile, TV-type CAI broadcasting and video telephone were included.

3-7. Conclusion

Many people can benefit from the instructional use of these new techniques, while it is taken for granted that those receiving school education or adult education receive much instructional information, particularly such socially weak people as "women, children, the aged, the mentally and physically handicapped," who are apt to be isolated from instructional information, will supposedly gain enormous benefit from the use of such new techniques. If only suitable terminal equipment is made available, instructional information adapted to the content level of each learner can be delivered to each district learning center, home and even to each room.

In the field of adult education, the trend seems to have prevailed in every country of adhering to the concentrated type of instructional structure. Even in utilizing radio and TV programs, which should be of value to a dispersed instructional structure, the trend has been discernible of trying to organize the audience into groups. It is very difficult to assemble people who have already scattered far and wide after graduating from school and to provide them with group education.

In undertaking the education of people who have joined society, it is much more effective to educate them in a dispersed instructional structure than a collective instructional structure. This is made possible by education utilizing broadcasting and telecommunications technology.

Moreover, in every country, while equal opportunity for education is being realized in the field of education of children with the implementation of compulsory education systems, hardly any consideration is being given to equal opportunity for education in the field of adult education. Broadcasting and telecommunications technology, which can be instrumental in realizing equal opportunity for education and removing regional gaps, may be said to be suitable and indispensable as media of adult education.

In short, is it not the duty of adult education in the future to make it possible for people in society to use superior instructional information, even if not in large

groups but on a small group or an individual basis? It is essential to eliminate the conventional notion that adult education can not be provided or give favourable results, unless people are assembled in some specified place. Otherwise, adult education will be unable to keep up with the explosive growth of the educational population foreseen in the future.

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